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WM Record File 106

WM Project 16
Docket No. _____
PDR
LPDR

Dr. Colin Heath
U. S. Department of Energy
Mail Station B-107
Washington, D. C. 20545

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Dear Dr. Heath:

Enclosed please find five copies of the trip report prepared by the U. S. Nuclear Regulatory Commission (NRC) staff on its September 8-19, 1980 trip to the Gulf Interior Region. I would like to bring to your attention several points, discussed in the report, concerning the siting investigations of salt domes in the Gulf Interior Region. These points are amplified in the section entitled "Observations" which begins on page 25.

1. Hydrogeologic information is central to an understanding of (1) radionuclide release scenarios and (2) protection of a salt dome from attack by groundwater. More emphasis needs to be placed on the hydrogeologic investigations, so that useful input can be developed in time for future site screening and site suitability decisions.
2. A regional approach is needed for hydrogeologic work in each study area. The defined boundaries of the study area in Mississippi are too restrictive for this purpose.
3. For modeling of radionuclide release pathways, the hydrologic parameters of both aquifers and confining units are needed. Work to date has concentrated almost exclusively on aquifers. The confining units need study.
4. Among some investigators, there are differences in: (a) the choice of computer codes for groundwater modeling; (b) the methodology for potentiometric surface investigations; and (c) the methods for correction of water level measurements for salinity. The significance of these differences in approach needs evaluation, and common approaches should be sought. If different approaches are continued, there should be an understanding of the relative reliability of each and the means of correlating the results so that comparisons can be made among sites, in documents submitted to NRC.
5. Attention should be directed to: (a) the need for more work in the chemistry of groundwater; (b) the possible use of observation wells to supplement the results of single well testing; and (c) more effective application of generally available subsurface data.
6. Screening criteria for salt domes were first established in 1978 (Y/OVI/TM-48), and some of these were echoed in April 1980 (DOE/NE-007). The validity of the "shale envelope" criterion is questioned, because this feature remains unproven in salt domes in general, and the demonstration of its existence around a selected dome is impracticable. Another criterion--the absence of uplift

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or subsidence during Quaternary time--may be unworkable for some domes, because the necessary geologic evidence may be lacking.

7. There has been some discussion of testing the integrity of a dome flank, as a barrier against groundwater, by drilling. While the integrity of a dome is an important matter, there is a high risk that any weakness in the barrier might not be identified in the drill holes, no matter how numerous. There is also a risk that drill holes might damage the barrier. An indirect approach, perhaps by groundwater chemistry, appears preferable.

8. In salt domes that have been mined by conventional means, it is recognized that a "central anomalous zone" may present hazards of various kinds. Although the existence of such a zone would not necessarily disqualify a dome for repository consideration, it would have an important effect on design and on the suitability of the dome. Unfortunately, detection of anomalous zones can now only be done by physical penetration, but some indirect methods of anomaly detection are in the R & D mode. If these methods are to be developed into operational tools, in time for site characterization, aggressive action is needed.

9. The salt dome investigation is a complex technical venture, with a wide range of disciplines, issues, locations and types of investigators. In most efforts of this type, improvements can be made in integration of results from the separate projects. In the salt dome work, attention could profitably be given to: (a) rationalization of differences in approach (as in item #4 above); (b) improved timing of key projects so the results can provide timely input into the decision-making matrix; and (c) application of knowledge gained in one state to other states and to the Gulf Interior Region as a whole.

The visit provided the NRC staff with an excellent opportunity to appreciate the broad range--both technically and physically--of the salt dome investigations. Considerable amounts of technical information were gained, which will be beneficial in developing regulatory and guidance documents. Hopefully, the observations will also be of use to the DOE and its contractors.

On behalf of the visit team, I wish to thank your organization for its time and attention in making the necessary arrangements. The staffs of DOE (Columbus), ONWI, and Law Engineering Testing Company were especially helpful, and the trip was well organized.

We will be pleased to discuss your comments on the report or any details therein. We look forward to subsequent trips to maintain awareness of the salt dome investigations.

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Sincerely,

Original Signed by
MICHAEL J. BELL

Michael J. Bell, Chief
High-Level Waste Technical
Development Branch
Division of Waste Management

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